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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,091	06/30/2003	Robert J. Steger	015290-682	8130

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EXAMINER

FIORITO, JAMES

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 10/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/608,091	STEGER, ROBERT J.	
	<b>Examiner</b>	<b>Art Unit</b>	
	James A. Fiorito	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 13, 14 and 24-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 15-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-31 are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>Oct 14 2003</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-12, and 15-23, are drawn to an apparatus, classified in class 118, subclass 728.
- II. Claims 13-14 and 24-31, are drawn to a method, classified in class 427, subclass 569.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the substrate support can be used in a process where the temperature is controlled using a heat transfer gas instead of a liquid.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Peter Skiff on October 6, 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-12 and 15-23. Affirmation of this election must be made by applicant in

Art Unit: 1763

replying to this Office action. Claims 13-14 and 24-31 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Drawings***

New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because Item 150 in Figure 6 appears to be supplying a gas through the substrate, which is contradictory to the specification. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-4,6,7-9,11,12,15-16,18-20, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805).**

*With respect to Claim 1:* Tamura discloses a substrate support useful in a reaction chamber of a plasma processing apparatus (Fig. 9), the substrate support comprising: a ceramic member (Fig. 9 Item 40); a metallic heat transfer member overlying the ceramic member (Fig. 9 Item 2), the heat transfer member including at

Art Unit: 1763

least one flow passage through which a liquid can be circulated to heat and/or cool the heat transfer member (Fig. 9 Item 42); and an electrostatic chuck overlying the heat transfer member (Fig. 9 Item 18), the electrostatic chuck having a support surface for supporting a substrate in a reaction chamber of a plasma processing apparatus (Fig. 9 Item 1).

Tamura does not expressly disclose the heat transfer member having a maximum thickness of about  $\frac{1}{4}$  inch.

At the time of invention it would have been obvious to one skilled in the art that designing a thin (e.g.  $\frac{1}{4}$  inch) heat transfer member with a low thermal mass would quicken the change in temperature of the heat transfer member given the same liquid flow rate as a thick (e.g.  $1\frac{1}{4}$  inch) heat transfer member. Alternatively, it would have been obvious to one skilled in the art to understand that the thin heat transfer member would have a faster change in temperature provided a smaller flow rate than the thick heat transfer member, if a broader range of inlet temperatures of the liquid were allowed. Also, many heat transfer member design parameters are not considered within the specification. Therefore, the heat transfer member having a maximum thickness of about  $\frac{1}{4}$  inch portion of Claim 1 lacks criticality.

*With respect to Claim 4:* Tamura discloses a substrate support further comprising a source of temperature controlled liquid in flow communication with the at least one flow passage (Fig. 9 Item 43).

*With respect to Claim 6:* Tamura discloses a heat transfer gas source operable to supply a heat transfer gas between the support surface and the substrate (Fig. 9 Item

21), and a controller operable to (i) control the volumetric flow rate and/or the temperature of the liquid circulated through the at least one flow passage (Fig. 9 Item 43), and/or (ii) to control the flow rate and/or pressure of the heat transfer gas supplied between the support surface and the substrate.

*With respect to Claim 7:* Tamura discloses the heat transfer member comprises a base including the at least one flow passage (Fig. 9 Item 42) and a cover overlying the base (Column 6 Lines 12-17).

*With respect to Claim 9:* Tamura discloses a substrate support further comprising a ceramic ring (Column 15 Lines 20-23) overlying the ceramic member and surrounding the heat transfer member and the electrostatic chuck, the heat transfer member being laterally spaced from the ceramic ring, the electrostatic chuck contacting the ceramic ring (Fig. 9 Item 36).

*With respect to Claim 11:* Tamura discloses a substrate support further comprising an elastomeric joint between the ceramic member and the heat transfer member, and an elastomeric joint between the heat transfer member and the electrostatic chuck (Column 18 Lines 44-48).

*With respect to Claim 12:* Tamura discloses a plasma processing apparatus comprising the substrate support of Claim 1 (Fig. 1).

*With respect to Claim 15:* Tamura discloses A substrate support useful in a plasma processing apparatus, comprising, a source of temperature controlled liquid (Fig. 9 Item 43), a ceramic member (Fig. 9 Item 40), a metallic heat transfer member overlying the ceramic member (Fig. 9 Item 2), the heat transfer member including at

Art Unit: 1763

least one flow passage in fluid communication with the liquid source and through which the liquid can be circulated to heat and/or cool the heat transfer member at a rate of from about 0.25-2°C/sec (Fig. 9 Item 2, Column 15 Lines 41-47); and an electrostatic chuck overlying the heat transfer member (Fig. 9 Item 18), the electrostatic chuck having a support surface for supporting a substrate in a reaction chamber of a plasma processing apparatus (Fig. 9 Item 1).

*With respect to claim 18:* Tamura discloses the heat transfer member comprises a base including at least one flow passage (Fig. 9 Item 42), and a cover overlying the base (Column 6 Lines 12-17).

*With respect to Claim 20:* Tamura discloses a substrate support of Claim 15, further comprising a ceramic ring (Column 15 Lines 20-23) overlying the ceramic member and surrounding the heat transfer member and the electrostatic chuck, the heat transfer member being laterally spaced from the ceramic ring, the electrostatic chuck contacting the ceramic ring (Fig. 9 Item 36).

*With respect to Claim 22:* Tamura discloses a substrate support further comprising an elastomeric joint between the ceramic member and the heat transfer member, and an elastomeric joint between the heat transfer member and the electrostatic chuck (Column 18 Lines 44-47).

*With respect to Claim 23:* Tamura discloses a plasma processing apparatus comprising the substrate support of Claim 15 (Fig. 1).

*With respect to Claims 1-3, and 16:* It would have been obvious to one having ordinary skill in the art to have determined the optimum values of the relevant process

Art Unit: 1763

parameters through routine experimentation in the absence of a showing of criticality. *In re Malagari*, 182 USPPQ 549 (CCPA 1974).

It would have been obvious to one of ordinary skill in the art to decrease the thickness of the heat transfer member of Tamura to obtain the invention of Claims 1-3 and 16. The dimensions of the heat transfer member and the fluid flow channels claimed lack criticality. Given an equal fluid flow rate it is obvious that a thinner plate would have a quicker change in temperature. Also, it is obvious that a heat transfer member provided with a larger range of inlet liquid temperatures would have the capability of quicker change in temperature compared to a heat transfer member of equal size with a narrow range of inlet liquid temperatures. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to create the substrate support disclosed by Tamura with the various dimensions of Claims 1-3 and 16 to obtain the invention of Claims 1-3 and 16.

*With respect to Claims 8 and 19:* It would have been obvious to one of ordinary skill in the art at the time of invention to form the substrate support of Tamura in accordance with Claims 8 and 19, since the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and the device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device. In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984).



**Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805) in view of Kanno (US 6,373,681).**

*With respect to Claims 10 and 21:* Tamura discloses a substrate support in accordance with Claims 10 and 21.

Tamura does not expressly disclose an RF power source electrically connected to the heat transfer member.

Kanno discloses an RF power source electrically connected to the heat transfer member (Fig. 1 Item 7). Tamura and Kanno are analogous art because they are from the same field of endeavor, namely plasma processing substrate supports.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form Tamura's apparatus including an RF power source electrically connected to the heat transfer member in view of the teaching of Kanno. The suggestion or motivation for doing so would have been to supply power for generating a plasma. Therefore, it would have been obvious at the time of invention to combine Tamura with Kanno for the benefit of a heat transfer member that could also be connected to a power source to generate a plasma.

**Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805) in view of Oda (US 6,474,986).**

*With respect to Claim 5:* Tamura discloses a substrate support in accordance with Claim 4.

Tamura does not expressly disclose the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature.

Oda discloses a substrate support wherein the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature (Fig. 14 Item 106). Tamura and Kanno are analogous art because they are from the same field of endeavor, namely coating process substrate supports.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form Tamura's apparatus including the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature in view of the teaching of Oda. The suggestion or motivation for doing so would have been to cool the refrigerant in a cooling container to a predetermined temperature by a Peltier effect (Column 2 Lines 37-38). Therefore it would obvious to combine Tamura with Oda for the benefit of the source of temperature controlled liquid includes a Peltier cooler operable to change the temperature of the liquid to a selected temperature to obtain the invention specified in Claim 5.

**Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura (US 6,676,805) in view of Yang (US 6,635,580).**

*With respect to Claim 17:* Tamura discloses a substrate support in accordance with Claim 15, further comprising: a heat transfer gas source operable to supply a heat transfer gas between the support surface and the substrate; and a controller operable to control operation of the liquid source (Column 15 Lines 41-47).

Tamura does not expressly disclose a controller operable to control operation of the heat transfer gas source.

Yang discloses a controller operable to control operation of the heat transfer gas source (Fig. 3 Item 80). Tamura and Yang are analogous art because they are from the same field of endeavor, namely plasma chamber substrate holders.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form Tamura's substrate holder including a controller operable to control operation of the heat transfer gas source in view of the teaching by Yang. The suggestion or motivation for doing so would have been to control the temperature of the substrate. Therefore it would have been obvious to combine Tamura with Yang for the benefit of a controller operable to control operation of the heat transfer gas source to obtain the invention specified in Claim 17.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Fiorito whose telephone number is (571)272-7426. The examiner can normally be reached on Standard.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1763

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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